

1 [0058]

ABSTRACT OF THE INVENTION

2 [0059] A method of etching an underlying inorganic substrate through a patterned
3 photoresist, including exposing a structure comprising said inorganic substrate and patterned
4 photoresist to a plasma etchant generated from a plasma source gas including at least one
5 fluorine-comprising gas and sulfur dioxide (SO₂). The amount of sulfur dioxide present in
6 said plasma source gas may be varied during the etching process. The method is particularly
7 useful when the photoresist is a DUV photoresist. One of the preferred embodiments of the
8 method is the etching of silicon nitride (SiN_x) through a DUV photoresist, where the plasma
9 source gas used to provide the etchant includes at least one fluorine-comprising gas, argon,
10 and sulfur dioxide. Other preferred fluorine-comprising gases include nitrogen trifluoride
11 (NF₃), carbon tetrafluoride (CF₄), and sulfur hexafluoride (SF₆).